

Remarks/Arguments:

Claims 29, 30, 33, 34 and 42-45 are pending and rejected in the application. Independent claims 29 and 44 have been amended. No new matter has been added.

On page 4, the Official Action rejects claims 29, 30, 33, 34, 42 and 43 under 35 U.S.C. § 103(a) as being unpatentable over Onggosanusi et al. (US 7,110,378) in view of Wallace et al. (US 2002/0193146), Alastalo et al. (US 2001/0047424), Heath, Jr. et al. (US 6,937,592) and Walton et al. (US 2003/0128658). It is respectfully submitted, however, that the claims are patentable over the art of record for at least the reasons set forth below.

Applicants' invention, as recited by claim 29, includes features which are neither disclosed nor suggested by the art of record, namely:

... beam forming section forms, for the SDM incompatible mobile station, a ... transmission beam ...and, for the SDM compatible mobile station ... another transmission beam ... wherein the beam forming section forms the transmission beam to the SDM incompatible mobile station by use of one space division multiplex channel and forms the another transmission beam to the SDM compatible mobile station by use of a plurality of space division multiplex channels.

Claim 29 relates to a base station which simultaneously communicates over the same frequency band with an SDM compatible mobile station and an SDM incompatible mobile station. Specifically, the base station transmits a single beam to the SDM incompatible mobile station (i.e., a mobile station which only has one receive antenna). In contrast, the base station transmits a plurality of beams to the SDM compatible mobile station (a mobile station which has two or more antennas). This feature is supported on pages 20-22 and 27-32 of Applicants' specification and furthermore, shown in at least Fig. 1. No new matter has been added.

Wallace discloses a system which queries a remote station for antenna diversity status (i.e., the base station asks the mobile station how many antennas it has for diversity reception).

Onggosanusi is relied upon for suggesting a space orthogonalizing section for performing a weighted transmission (i.e., beam forming based on a weighted process).

Alastalo suggests determining if a mobile station is SDMA compatible based on a spatial signature (if mobile stations have uncorrelated spatial signatures, then they are SDMA compatible).

Heath suggests a system which supports multiple modes of communication (the system adapts its mode of operation between spatial multiplexing and non-spatial multiplexing in response to transmission variables).

Furthermore, Walton suggests a system where a plurality of SDMA mobile stations are able to operate in the same frequency channel due to uncorrelated spatial signatures.

However, neither Onggosanusi, Wallace, Alastalo, Heath, Walton, nor their combination suggests being able to form either a single beam for an SDM incompatible station and multiple beams for an SDM compatible mobile station.

Specifically, the base station as shown in Walton's Fig. 1 transmits a single beam to each of the mobile stations 106A-106H even though the mobile stations have more than one receive antenna (each of the mobile station antennas receives a single beam from the base station) and (not multiple beams).

Applicants' claim 1 is different than the art of record, because the base station is able to determine if the mobile stations are SDM compatible or incompatible. If it is determined that the mobile stations are SDM incompatible, then a single transmission beam is formed. However, if the base station determines that the mobile station is SDM compatible, then a plurality of beams are formed. This allows the base station to communicate simultaneously with both SDM compatible and SDM incompatible mobile stations ("*... beam forming section makes, for the SDM incompatible mobile station, a ... transmission beam ..., for the SDM compatible mobile station ... another transmission beam ... wherein the beam forming section forms the transmission beam to the SDM incompatible mobile station by use of one*

space division multiplex channel and forms the another transmission beam to the SDM compatible mobile station by use of a plurality of space division multiplex channels").

As shown in Applicants' Fig. 1, base station 1 includes a plurality of antennas which are able to form and transmit transmission beams over a plurality of space division multiplex channels. Specifically, base station 1 determines whether mobile stations 2-1, 2-2, 3-1, 3-2 and 3-3 are SDM compatible or SDM incompatible (i.e., whether the mobile stations have one antenna or multiple antennas). If it is determined that the mobile station has one antenna, then a single beam is formed by base station 1 and transmitted to the mobile station. However, if it is determined that the mobile station has more than one antenna, then more than one transmission beam is formed by base station 1 and transmitted to the mobile station.

For example, as shown in Fig. 1, base station 1 determines that mobile stations 3-1 and 3-2 are SDM incompatible (i.e., the mobile stations have only one antenna). Thus, base station 1 forms a single beam in a single space division multiplex channel for each of the mobile stations (i.e., only one beam is transmitted to each mobile station, respectively). However, base station 1 also determines that mobile station 2-1 is SDM compatible (mobile station 2-1 has two antennas). Thus, base station 1 forms two beams which are transmitted to mobile station 2-1 (i.e., beam 4-3 is directed to a first antenna of mobile station 2-1 while beam 4-4 is directed to a second antenna of mobile station 2-1). Thus, SDM incompatible mobile stations receive a single beam over a single space division multiplex channel, whereas SDM compatible mobile stations receive a plurality of beams over a plurality of space division multiplex channels. Accordingly, for the reasons set forth above, claim 29 is patentable over the art of record.

Dependent claims 30, 33, 34, 42 and 43 include all of the features of the claims from which they depend. Thus, these claims are also patentable over the art of record for at least the reasons set forth above.

On page 14, the Official Action rejects claim 44 under 35 U.S.C. § 103(a) as being unpatentable over Wallace in view of Alastalo and further in view of Walton. Claim 44 has similar features to claim 29. Thus, independent claim 44 is also patentable over the art of record for at least the reasons set forth above.

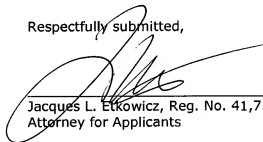
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On page 16, the Official Action rejects claim 45 under 35 U.S.C. § 103(a) as being unpatentable over Wallace in view of Alastalo, in view of Walton and further in view of Onggosanusi. Claim 45 includes all of the features of claim 44 from which it depends. Thus, independent claim 45 is also patentable over the art of record for at least the reasons set forth above.

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,



Jacques L. Etkowicz, Reg. No. 41,738
Attorney for Applicants

RAE/fp

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P.O. Box 980
Valley Forge, PA 19482
(610) 407-0700

NM1014368